

Pregnancy and advanced maternal age

**An Honors Thesis (HONR 499)**

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### **Abstract:**

Advanced maternal age has been a common occurrence within the last decade. Today, women are much more active outside of the home and childbearing has been postponed as careers and finances have become the main focus of younger adult women. Although pregnancy is a natural occurrence, older age can have negative effects on both the mother and baby. There are several complications that can arise and many problems that are not pregnancy-related. This topic hasn't been as widely researched due to it being a recent trend and change. This paper will look at the normal processes of pregnancy, the effects of aging in women, and the combination of these two in a pregnant woman of advanced age. This topic also personally related to a family member of my own.

## **Introduction**

Currently, there are several changes to societal norms. One thing majorly affected by the changes of time has been childbearing. In previous decades and centuries, women had children as early as their teens and would live to produce large families. As women have begun to expand their educational and career horizons, childbearing has been moved from a top priority, to a milestone that can be reached later in life. Advancing careers and knowledge base are priorities of the current generation; however, family life has suffered in some ways. Families are smaller, expansion is delayed, and maternal age has increased significantly. Although a woman should bear children as long as her body allows, the process of aging makes changes to the body which can affect the process of pregnancy, labor, and the postpartum period. As advanced maternal age becomes more common, there needs to be more research to understand the normal effects and complications of both aging and pregnancy so that a combination of the two can be better understood. This paper will discuss the normal processes of both aging and pregnancy, look at the results of this combination, and conclude with a better understanding of this new trend.

## **Pregnancy**

Pregnancy is a normal process. Every woman is born with a set number of eggs awaiting fertilization to create life. The optimal age for pregnancy is between the ages of 20 and 35; fertility and the quality of eggs declines with the increase of age (Johnson & Tough, 2012). In women, the oocyte pool peaks while the female fetus is in utero reaching approximately 6 to 7 million at 20 weeks gestation; progressive atresia (loss of eggs) occurs so that at birth the female only has 1 to 2 million oocytes and at puberty there are only 250,000 oocytes. Atresia continues and is accelerated at 37 years of age so that by menopause (average age 51) only 1,000 oocytes remain (Johnson & Tough, 2012). After the age of 35, the chance for miscarriage, spontaneous abortion, complications, and adverse outcomes increases. There is also an increased risk for

preterm birth, perinatal mortality and morbidity, and maternal mortality and morbidity (Johnson & Tough, 2012).

During pregnancy, the body goes through three trimesters averaging 12 weeks with an overall pregnancy of 40 weeks or 9 full months. The body changes to care for both the mother and fetus by increasing the amount of blood flowing, making physical changes to accommodate room for the baby, and increasing hormone production to maintain the pregnancy. Due to so many changes, some women have many negative effects while pregnant and sometimes these effects continue after delivery of the baby. There are many complications that can occur with pregnancy but the top five are hypertension, gestational diabetes, depression, abnormal bleeding, and preterm delivery.

Hypertension is considered having a blood pressure greater than 140/90 mmHg (120/80 mmHg being the optimal blood pressure) due to increased blood amount or blockage in the arteries. During pregnancy, women retain more fluids and have an increased amount of blood which puts them at risk for this condition. While pregnant, the condition is called preeclampsia and if it becomes severe enough it can lead to eclampsia. Preeclampsia is characterized by blood pressure of 140/90 or greater and proteinuria 1-2+, as well as generalized edema of faces and extremities, and weight gain of 1.5 kg/mo in 2<sup>nd</sup> trimester and 0.5kg/week in 3<sup>rd</sup> trimester. Eclampsia is a medical emergency and is characterized by a blood pressure >180/110, grand mal seizures, and coma (Ladewig, London, & Davidson, 2014).

Gestational diabetes is described as a diabetic condition that is a result of pregnancy and generally resolves with delivery. This condition usually occurs in the 2<sup>nd</sup> half of pregnancy. Those who are diabetic prior to pregnancy will remain so during pregnancy and those who have been categorized as “pre-diabetic” are at a greater risk for gestational diabetes (Ladewig,

London, & Davidson, 2014). During pregnancy, the placenta produces increased estrogen, progesterone, and human placental lactogen hormones which cause an increase in resistance to insulin (Ladewig, London, & Davidson, 2014). The decreased effectiveness of insulin leads to a catabolic state during fasting periods, metabolizing of fat, the presence of ketones in urine, and a blood sugar greater than 100 (Ladewig, London, & Davidson, 2014).

Depression, or “baby blues,” is a common occurrence following delivery. Although it has not been fully researched, it is thought that the large amount of hormone fluctuation caused by pregnancy and delivery can cause this complication. “Baby blues” are considered a mild form of depression that occurs a few days after delivery; it can be self-limiting for a few hours to days due to the mom feeling overwhelmed, unable to cope, fatigued, and oversensitive (Ladewig, London, & Davidson, 2014). This generally resolves on its own in a few days to weeks and the mother can then bond with her baby (Ladewig, London, & Davidson, 2014). Occasionally, the baby blues do not resolve and progresses to depression and postpartum psychosis. Depression occurs in 7-16% of all mothers in North America and may occur anytime in the first year postpartum but generally just before menses resume or upon weaning baby from the breast (Ladewig, London, & Davidson, 2014). Psychosis occurs in every 1-2 out of 1,000 pregnancies and usually occurs within the first 3 months postpartum; the mom will be agitated and hyperactive, and will have insomnia, poor judgment, confusion, mood lability, irrationality, difficulty remembering or concentrating, delusions, and hallucinations (Ladewig, London, & Davidson, 2014). In this case, the baby is not safe with mom and medical attention is needed.

The last two complications go together. Bleeding and preterm labor are two major complications. Bleeding can occur prior to labor or be due to hemorrhage after delivery; preterm labor can cause bleeding. Bleeding during pregnancy is 1 of 3 leading causes of maternal and

fetal death; during the 1<sup>st</sup> and 2<sup>nd</sup> trimesters abortion (spontaneous) is the major cause of bleeding with ectopic bleeding being another cause (Ladewig, London, & Davidson, 2014). During the 3<sup>rd</sup> trimester, different forms of placental problems can cause bleeding: placenta previa (placenta blocks cervix), placenta accreta (placenta embeds into uterine wall), or placenta abruption (placenta detaches) (Ladewig, London, & Davidson, 2014). After delivery, the major cause of bleeding is postpartum hemorrhage, which occurs when the uterus is not contracting and clamping down (known as atony). Lacerations from delivery can also occur resulting in hemorrhage.

Preterm delivery is a major complication, if not one of the most serious, and is often a part of education as a means of prevention. This usually occurs between 20 and 37 weeks of pregnancy (prior to 20 weeks the fetus is not viable and delivery is referred to as an abortion) (Ladewig, London, & Davidson, 2014). Even though only 8-11% of live births are premature, it is still a common problem (Ladewig, London, & Davidson, 2014). Causes of premature delivery are both maternal and fetal. Maternal factors are cardiovascular or renal disease, diabetes, pregnancy-induced hypertension (PIH) or preeclampsia, abdominal surgery, history of a cone biopsy, blow to the abdomen, uterine anomalies, cervical incompetence, infection/periodontal disease, low socioeconomic status, history of preterm birth, and DES exposure (Ladewig, London, & Davidson, 2014). Fetal factors are multiple gestations, hydramnios, fetal infection, placenta previa, and placenta abruption (Ladewig, London, & Davidson, 2014).

### **Age**

Aging, as with pregnancy, causes many changes in the body. As the body ages, the functioning of major organs decreases, the body is not as flexible, and healing takes a longer time. There are many changes that occur with aging that have even more negative effects on the

body. The top five chronic illnesses or diseases that occur with women are heart failure, hypertension, osteoporosis, cancer, and depression.

Heart failure and hypertension tend to go together. Often times, hypertension is the cause of heart failure. Hypertension, as discussed previously, is characterized by a consistent blood pressure of greater than 140/90 mmHg caused by obstruction or increased blood in the arteries. Heart failure is basically the failure of the heart to do its basic functions. The causes of heart failure are ischemic disease, hypertension, arrhythmias, valve disorders, myocarditis, and cardiomyopathy as well as sedentary lifestyle, genetics, and race (Nicholson, 2014). Symptoms of hypertension are shortness of breath, nocturnal cough, sleep disorder, fatigue, reduced exercise capacity, peripheral edema, loss of appetite, bloating, confusion, palpitations, angina, syncope, depression, anxiety, tachycardia, tachypnea, and wheezing (Nicholson, 2014). In order to care for these conditions, many take medications such as beta blockers and ace inhibitors which work well to improve the function of the heart but can have negative side effects (Nicholson, 2014).

Osteoporosis is another condition women are at high risk for as they age. It is a chronic, progressive disease characterized by low bone mass, bone deterioration, and decreased bone strength (Cheng, & Gupta, 2013). Osteoporosis puts women at risk for increased bone fragility and fractures. The major cause of this condition is low bone mineral density, which is measured by a Z score; a person with a Z score of less than -2.0 is diagnosed with osteoporosis (Cheng, & Gupta, 2013). Women need to maintain an intake of 1500 mg of calcium a day to prevent this condition and maintain bone density (Cheng, & Gupta, 2013).

Depression can occur as a result of menopause, aging, or both in the older woman. During menopause and aging, which are both major life changes, women experience fluctuations

in hormones which can be a cause of depression, just as it occurs in postpartum women.

Menopause is the final menstrual period confirmed by 12 consecutive months without a period or when the ovaries are removed/permanently damaged (Morgan et al., 2012). The transition to menopause causes women to have feelings of disequilibrium because they are adapting to this new change and have feelings of vulnerability (Morgan et al., 2012). Women during this time are also labeled as unstable and unpredictable; they experience menstrual changes, irritability, mood swings, night sweat, hot flashes, a loss of control, extreme emotions, and most importantly, depression (Morgan et al., 2012). This transition is up to 6 years prior to menopause and lasts 1 year after; this usually occurs between ages 39-51 (Morgan et al., 2012). Most women do not realize they are going through menopause. Many women stated that having more important priorities, parenting, caring for their own parents, dealing with parents, and being unfamiliar with what to expect prevented them from recognizing the transition (Morgan et al., 2012).

The last major occurrence in older women is cancer, mainly of the breast. This cancer occurs in 1 of every 8 women. After age 40, or 35 with family history, women should be screened regularly to prevent this disease. Women who have cancer experience immune suppression, fatigue, and depression and depending on the route of treatment, women can also experience a disturbed body image. Women who have never had children, or waited until later in life to have children are at risk for this cancer as well as those with family history.

### **Pregnancy and advanced age**

The purpose of the two previous sections was to show all the problems that can arise with pregnancy and aging. Although both are natural parts of life, they can cause some serious, unwanted, adverse effects. The combination of the two, although doable, can be even more dangerous for both the mother and the baby.



From 1970 to 2006, the incidence of women in the United States having their first birth after age 35 has gone from 1 in 100 to 1 in 12 women; this trend is similar in European countries (Morgan et al., 2012). Increases in fertility treatments and assisted reproductive technologies (ART) have made it possible for women to conceive late in life and after menopause (as late as 70 years old). Prior to this technology, the oldest woman to deliver was 57 years old (Johnson & Tough, 2012). As the trend continues, our society will have to anticipate the increase in demand for ART and associated needs for better prenatal, postpartum, and early developmental care (Johnson & Tough, 2012).

Delayed childbearing is now defined as pregnancy occurring in women over the age of 35; very advanced maternal age is older than 40 or also called a mature gravida or extremely elderly gravida (Johnson & Tough, 2012). The delay in childbearing has been caused by effective contraception use with adequate education, changes in societal expectations of women in post-secondary education and workforce, and increased population of women ages 35 to 44 (Johnson & Tough, 2012). Due to the delay and postponement of childbirth, the total number of births to women has decreased, the size and composition of families have changed, and the growth of the population is at risk (Johnson & Tough, 2012). There is also a risk that a woman may never conceive; although women have postponed childbirth with the knowledge that ART is available, there is no guarantee that a live birth will be achieved.

There are some benefits to delayed childbirth. Financial security and relationship factors (partner's interest and suitability for parenting) have influenced this delay until both factors are achieved (Johnson & Tough, 2012). Older women also adapt to life changes more positively and effectively than younger moms (Johnson & Tough, 2012). These women also realize that because they are older, they have the probability of missing out on their child's life or acquiring

illnesses associated with older age, so they value their health and pursue healthy behaviors so that they will be there for their child's important milestones (Morgan et al., 2012). Older women also have more experience and knowledge, and generally are happier about the birth of the child that has been delayed either on purpose or due to complications (Johnson & Tough, 2012).

Although there are benefits, there are other possible consequences of delayed childbearing. Advanced maternal age is associated with longer time to achieve conception; the probability of achieving pregnancy in one menstrual cycle declines in the early 30s (generally age 32) and is evident by age 37 (Johnson & Tough, 2012). Although it may be possible to conceive, women past the recommended age are less likely to have pregnancies that progress to live births; this is due to high rates of aneuploidy (presence of abnormal number of chromosomes) and spontaneous abortions (Johnson & Tough, 2012). If a woman cannot conceive naturally, she should have fertility evaluation after 6 months of trying if age 35 to 37, or earlier with increased age (Johnson & Tough, 2012). Often, older women have undiagnosed medical problems, are obese, and have lifestyle factors such as decreased sexual intercourse, all of which affect fertility (Johnson & Tough, 2012). If unable to conceive naturally, women can conceive through ART and if that does not work, they can use egg donation (typically required for women over 40) (Johnson & Tough, 2012). Another factor that is not commonly thought of is paternal age. In most cases, older women are married or have a partner in the same age range as them. If that is the case, his fertility has decreased with age as well. Advanced paternal age has an increased risk of gene mutations as well as decrease in the of quality sperm (Johnson & Tough, 2012).

There are several risks and complications that can occur if pregnancy is achieved. The use of ART increases the risk of multiple gestations (Johnson & Tough, 2012). With advanced

maternal age, there are also increases in the incidence of structurally malformed infants and increased risks of heart defects, clubfoot, diaphragmatic hernia, spontaneous abortion, ectopic pregnancy (due to multiple sex partners, pelvic infection, and tubal pathology), placenta previa, placenta abruption, gestational diabetes, eclampsia, PIH, cesarean section delivery, chromosome disorder, and preterm delivery (Johnson & Tough, 2012). There are also postpartum risks for the mother such as hemorrhage, fever, need for blood transfusion, and a prolonged hospital stay; for the infant there is an increased risk for low birth weight and NICU admission (Yogev et al., 2010). Advanced maternal age is also correlated with shorter or precipitous labor (less than 3 hours) which can be problematic if the mother lives far away from the hospital or can cause fetal distress, tearing, uterine bleeding, hemorrhage, and low oxygen levels (Zaki, Hibbard, & Kominiarek, 2013).

Older women also have personal fears associated with having a pregnancy later in life. There is generally a better understanding of risks based on mothers' own experiences or shared stories; women who are familiar with the risks often have more concerns for the pregnancy (Bayrampour et al., 2012). Although most mothers consider themselves healthy and feel that they have control over their pregnancy, an expected and predictable pregnancy complication is seen as less of a risk than an unexpected one (Bayrampour et al., 2012). Women who have pregnancy complications typically have higher anxiety and feel a sense of loss of control over their body and health; occasionally some women were overly emotional as well as anxious if they perceived their pregnancy as a risk (Bayrampour et al., 2012). Women agreed that waiting for results, discussing risks with the physician, bed rest, and limiting physical activities increased stress (Bayrampour et al., 2012). It has been found that education, engaging in a healthy lifestyle, positive opinions from the physician, undertaking reassuring screenings, relying on religious

beliefs and hope, and balancing the risks with the positive aspects of advanced maternal age helped alleviate stress (Bayrampour et al., 2012).

### **Conclusion**

Overall, being pregnant or older can be complicated and even more so when combining the two. There are so many changes the body endures during these natural processes of life that complications could be expected; combining the two together makes for an even riskier period. However, so many people want children and for whatever the reason, delaying childbirth is common. Physicians and health care providers need to better research these two topics so that excellent care can be given to both prevent complications and deal with those that occur to overall prevent death and improve the quality of life for both mom and baby. This topic is special to me because my mother falls into this category; although I was born when my mother was 19 and my sister was born when she was 27, my one-year-old brother was born just last year when my mother was 41. She already had hypertension which surprisingly disappeared during pregnancy but she did also have a rough labor. She had no problems conceiving because this pregnancy was unplanned but did choose to have a tubal to prevent future pregnancies. My mother had a great physician and no complications occurred but she was lucky because she was at risk. Maternal age does matter, but it shouldn't deter women from childbearing.

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